

Product Manual

ICC1-IR

IR TV Controller, 1-way RF Coax Control
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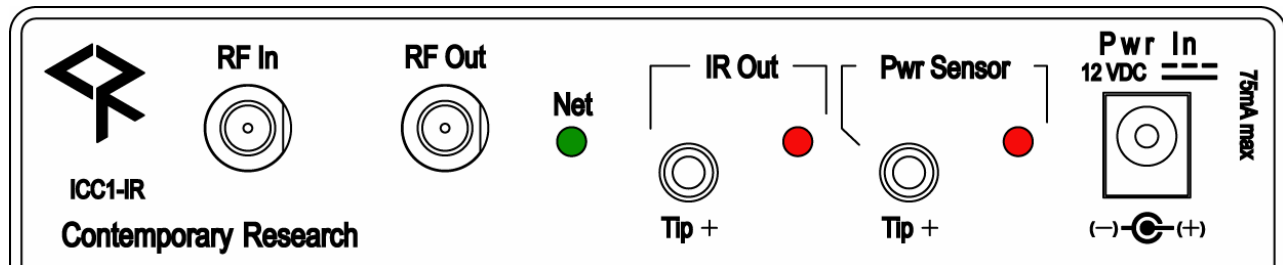
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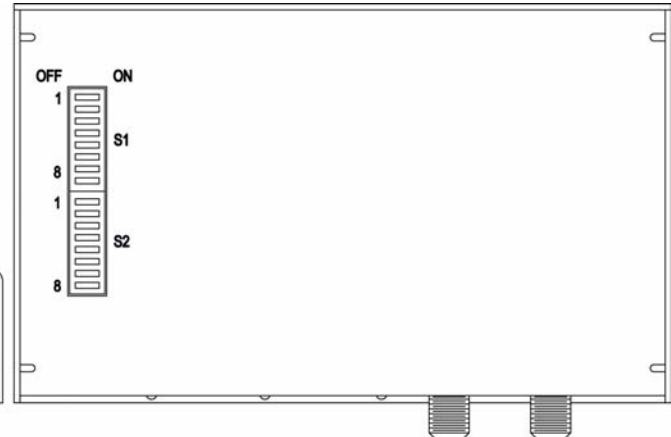
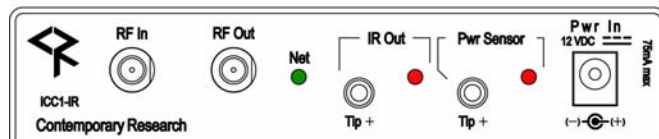
Overview



The ICC1-IR IR TV Controller delivers economical 1-way control for TV power, volume, and channels, receiving iCC-Net network commands over the same broadband coax that carries the CATV channels. Compact in size and price, the ICC1-IR features sensed power on/off control and intelligent tuning from a channel list stored in onboard non-volatile memory.

- Controls most brands of IR-controlled TVs
 - Manages channel access by changing the TV's internal available channel list
 - Delivers absolute power control with included CC-HSD scan frequency sensor
- Networks with up to 4,000 TVs through the ICC-HE Head-End Network Controller (HE)
 - Receives 1-way individual and zone commands from a single RS-232 port on the HE
 - Operates over same RF coax cable as CATV channels
 - Low-loss internal RF tap saves amplification and installation costs
- Provides LED feedback for network, IR control, and power status
- Restores all power and channel status after loss of power from data stored in non-volatile memory
- Mounts on the back of the TV for simplified control and RF installation
- Operates with Contemporary Research ABC Media System and iC Commander software, as well as from RS-232 protocol from a custom-programmed PC or control system
- Includes CC-HSD Scan Sensor, CC-IRE IR Emitter, RF loop cable, mounting Velcro, and 12VDC power supply (U.S. only)

Specifications



Physical

Size: 5.5" [140mm] wide x 1.1" [28mm] height x 3.4" [86mm] deep
Weight: 8 oz [226g]
Enclosure: All aluminum with durable black powder coat paint
Mounting: Mounts rear of TV

Rear Panel

RF In: 'F', female, 75 ohm impedance, RF from CATV system, iCC-Net control
RF Out: 'F', female, 75 ohm impedance, RF to TV, less than -1.5 dbmV loss
Net LED: Green LED for iC-Net bus and DC power, flashes once per second if active
IR Out: 3.5mm jack for CC-IRE IR Emitter cable or compatible CC-IRS serial cable
Supports carrier frequencies up to 62 KHz
Shipped with CC-IRE cable, 10 foot with stick-on IR emitter
IR Out LED: Red LED lights when sending IR commands
Power Sensor: 3.5mm jack for included CC-HSD scan sensor or 5V logic-level input
Power Sensor LED: Red LED lights when sensor indicates power on
Power In: 2.1mm coaxial jack (inside center conductor positive), 75 Ma maximum
11.5 to 16.5 VDC, 12 VDC typical (may be unregulated)
North American version includes UL/CSA listed wall power supply
DIP Switches: S1 and S2, located on bottom of unit, sets IR code operation and device number

iCC-Net

Operation: 1-way control, carried over the same RF coax connection as TV channels
Data Receive: Mid-band VHF, 74.7MHz, sent from ICC-HE
-25 to +35 dBmV signal level

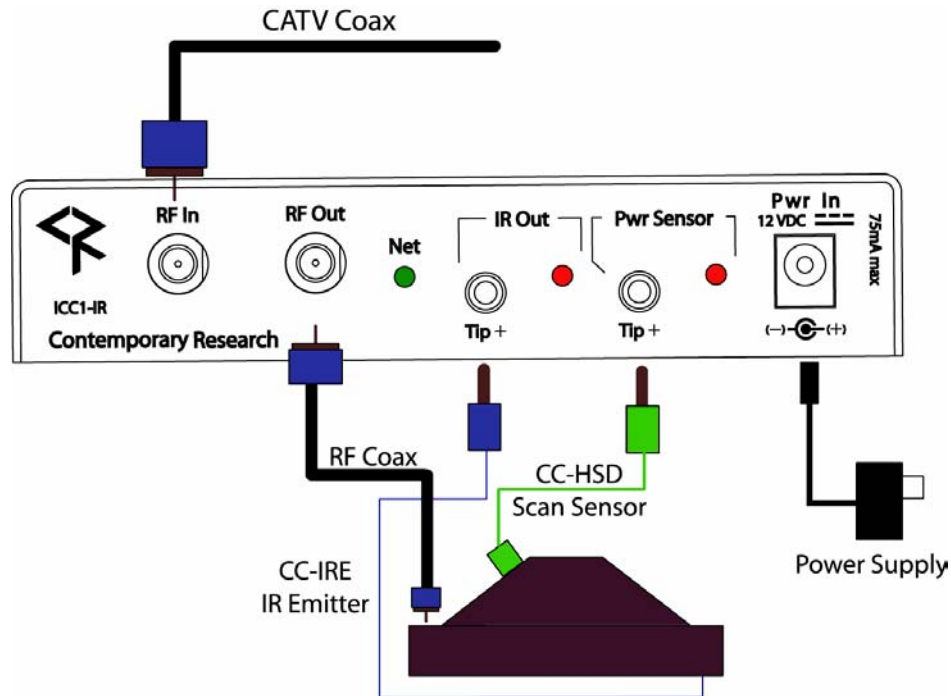
CC-HSD Scan Sensor

Range: Senses presence of TV scanning, from 15-35 KHz, magnetic pick-up
Includes: 3.5mm plug, 4ft. cable, stick-on TV sensor

Includes

CC-HSD Scan Sensor
CC-IRE IR Emitter
RF Loop cable, 18"
12 VDC power supply, 100 mA, (domestic US shipments only)
Mounting Velcro for unit and CC-HSD

Installation



AC Power Test

1. Insert DC power supply plug into 12 VDC jack..
2. Plug power adaptor into AC wall outlet.
3. The Net LED should turn on and stay lit.

RF Coax and iCC-Net Operation

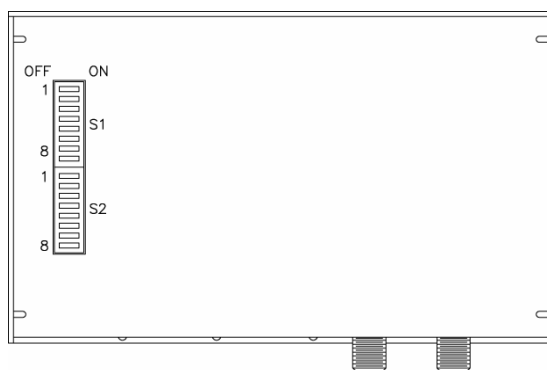
1. Connect the TV to CATV and observe quality of RF broadcasting. A low-quality CATV system can also affect performance of the iCC-Net commands. If needed, fix CATV problems before installing the system.
2. Connect the CATV RF Coax cable into the RF In input on the iCC1-IR.
3. If the iCC-Net signal is operating, the Net LED will blink once per second.
4. Connect the RF loop cable from the RF Out jack to the TV's RF connector (remember, you lose less than 1.5 dbmV by going through the ICC1-IR'S internal RF tap).

TV Power Sensing

1. Insert the CC-HSD Scan Sensor plug into the Power Sensor jack.
2. Turn on the TV using the TV's power button.
3. Move the CC-HSD sensor block around the rear of the TV to pick up scanning signal from the TV's horizontal transformer
4. Watch the Power Sensor LED as you move the sensor, stop moving when the LED lights steady.
5. Turn the TV on and off from its own power button, testing if the unit is reliably sensing power.
6. Mount the sensor to the TV, using the enclosed Velcro tape.

Tip: The best location for the sensor is usually on the lower left rear corner side corner (looking from the front), and it may help to rotate the sensor to search for best performance.

Setting IR Control Codes (IR Program Mode)



The DIP switches S1 and S1 at the bottom of the ICC1-IR serve in two modes, Program and Device, determined by S2 Switch 6. In this step, you'll set up the manufacturer's IR codes sent from the IR Out port. These may have been set at the factory, or you'll need to set them yourself.

1. Apply DC power to the ICC1-IR.
2. If the unit's device number has already been set, note the current settings for S1 switches 1-8 and S2 switches 1-4.
3. Set S2 Switch 6 to ON.
4. Look at the Manufacturer IR list and select the desired value.
5. Set S1 Switches 1 – 7 to match the value. For example to select the RCA codes, turn on S1 switches 1 and 7, adding up to 8 to match the value in the Manufacturer IR chart below.
6. Set S1 Switch 8 to OFF for toggling Power On/Off command typical for most TVs. (There are a few international TVs that use Key 1 for Power On)
7. Set S1 Switch 8 and S2 Switch 6 to OFF.
8. If unit's device number had been set before, return S1 switches 1-8 and S2 switches 1-4 to previous positions.

S1	Off Value	On Value
1	0	1
2	0	2
3	0	4
4	0	8
5	0	16
6	0	32
7	0	64
8	Toggle power	Key 1 = Power On
S2		
1		
2		
3		
4		
5		
6	Device Mode	IR Program Mode
7		
8		

Value	Manufacturer IR
1	Zenith
2	Panasonic
3	Toshiba
4	Hitachi
5	Sony
6	Grundig
7	Magnavox/Philips
8	RCA
9	Sony 2
10	Panasonic 2
11	Mitsubishi
14	Panasonic3 (2.0)
15	Sharp (2.0)

Setting Device Number and Parameters (Device Mode)

In the next step, you'll need to set up the device number and operation parameters for the ICC1-IR. Notice that the functions of the S1 and S2 switches change when you set the unit in Device mode.

1. Make sure S2 Switch 6 is OFF (unit in Device mode).
2. Set the **Device number** by turning on the switches that add up to the desired device number. For example, for Device #513 (1st device in Zone 2), S1 Switch 1 (1) and S2 Switch 2 (256) ON.
3. **IR Carrier:** Set S2 Switch 5 to OFF to send carrier with IR commands (default), ON to turn off carrier.
4. **Power Sense Level:** Set S2 Switch 7 to ON for high sensitivity for power (default), set to OFF if you need to lower sensitivity (usually 2 adjacent TVs – side-by-side or through a wall).
5. **IR Out Level:** Set S2 Switch 8 to ON for high signal level (default), set to OFF if you need to lower IR signal level to TV.

S1	Off Value	On Value
1	0	1
2	0	2
3	0	4
4	0	8
5	0	16
6	0	32
7	0	64
8	0	128
S2		
1	0	256
2	0	512
3	0	1024
4	0	2048
5	IR Carrier On	No Carrier
6	Device Mode	IR Program Mode
7	Power sense low	Power sense high
8	IR Out low	IR Out high

Device Number Setting

*Values in gray cells are the default settings.

Tip: Before you begin setting device numbers, be sure to create a **System Map** (See the **System Map** section in this manual), listing out all the device numbers you need, according to location and iC-Net Zone (See the **iC-Net Zone** section in this manual). By using a logical order of device numbers, you can really simplify installation. For example, the first unit in Zone 1 is 257 (256 + 1). For all the devices in Zone 1, just set S2 Switch 1 on for 256 for all units in that zone, then use the S1 switches to designate 1st, 2nd, 3rd, etc. device in that zone.

Of course, never use the Zone's Virtual Device number (256, 512, etc) as an actual device number. Whenever you send command to the zone's Virtual Device number, all units in that zone will respond at the same time.

IR Control Wiring

1. Connect the CC-IRE IR Emitter plug into the IR Out jack.
2. Mount the emitter cube to the TV case where the TV receives IR commands.
3. Mount the ICC1-IR to the TV using included Velcro tape.
4. Connect DC power to unit.

RS-232 Control Protocol

Overview

RS-232 control for up to 4000 TV Controllers is provided through an iC-series Head-End Network Controller. The ICC-HE Head-End manages iC-Net communication over RF Coax to ICC1 (1-way) and ICC2 (2-Way) TV Controllers as well as ICW TV Controllers over twisted-pair Cat3/5 wiring. The ICW-HE Head-End operates on the twisted-pair network only.

Each TV Controller is assigned a unique device number from 1 to 4000 to which control commands are addressed. The devices are organized into 16 zones of 255 devices. All the devices in each zone will respond to a single "virtual device number" — one device number that represents all devices in each zone. There is also a global device number, 4095, that will command all devices in the system. This feature dramatically speeds up system operation and programming, because one command can affect an entire group of devices—or all. To take advantages of this feature, review the section **iC-Net Zones** in this manual.

In ABC Media Retrieval Systems, we reserve the first group of devices, 1-255, for components operating on a connected control system. Zones 1-16 are used for CR TV Controllers, Video Display Controllers and Tuners. As it's unlikely any system will use all 4000 devices, this may be a good device standard for your system as well.

The Remote RS-232 port on the Head-End Network Controller can communicate from 1200 to 38.4K baud. The factory default setting is 19.2K baud, 8 data bits, No parity, and 1 stop bit.

Command String Structure

Characters in command strings are expressed in a combination of hex and ASCII characters. For clarity, the following protocol examples use the following conventions:

- Single-byte hex numbers are preceded by the '\$' symbol
- ASCII characters or strings are enclosed in single quotes
- Numbers not marked as hex or ASCII are a single decimal byte
- Parameters shown in < > brackets are single byte
- A series of multiple commands or parameters are set apart by [] brackets
- Commas separate the bytes, but are not part of the protocol
- Double quotes enclose the command string, but are not part of the protocol

Command format:

"\$A5,<dh>,<dl>,<ncb>,<cmd1>,<parameter> [<cmdN>]"

\$A5	Starts the command
<dh>	The zone or high order byte of the device
<dl>	The unit or low order byte of the device (0 for global zone)
<ncb>	The number of command bytes to follow
<cmd1>	The first command byte
<parameter>	Command parameters (not used by all commands)
[<cmdN>]	Multiple commands can be concatenated, with byte count added to <ncb>

RS-232 Commands

Command		Description
Power		This series of commands uses the sensed power capability of the ICC1-IR.
Power Off	P0	"\$A5,<dh>,<dl>,2,'P0' " (6 bytes)
Power On	P1	"\$A5,<dh>,<dl>,2,'P1' " (6 bytes)
Power Toggle	PT	"\$A5,<dh>,<dl>,2,'PT' " (6 bytes)
Volume	VL	"\$A5,<dh>,<dl>,3,'VL',<vol level>" (6 bytes) Sets TV volume level 0 = Mute 1 – 63 = Minimum level (1) to maximum volume (63)
<i>Ts & Qs</i>		<i>T-series channel commands select a channel and display the channel label on the TV, while Q-series commands don't show the on-screen text. As the ICC1-IR does not provide on-screen text, T and Q have the same effect. We've included the T-series commands here, but the unit will respond to Q commands as well.</i>
Channel Up	TU	"\$A5,<dh>,<dl>,2,'TU' " (6 bytes) – Tunes to next channel up in Tune Ring
Channel Dwn	TD	"\$A5,<dh>,<dl>,2,'TD' " (6 bytes) – Tunes to next channel down in Tune Ring
Force Channel	TC	"\$A5,<dh>,<dl>,3,'TC', <channel>" (7 bytes) – Tunes to a specific channel 124 = RGB 2 input on TV 125 = RGB input on TV 126 = Select TV's composite A/V input 127 = Select S-Video Input 0 = Blank video output to TV 255 = Unblank TV video (restore to previous channel) Tip: Not all TVs have S-Video and RGB inputs.
Select Channel	TT	"\$A5,<dh>,<dl>,2,'TT' " (6 bytes) – Tunes channel if included in Tune Ring
Tune Ring	TR	"\$A5,<dh>,<dl>,<ncb>,'TR', [<chan 1>, <chan N>]" (variable bytes) This command stores a Tune Ring, a series of preset channels accessed by channel up/down commands. Ex1: "\$A5,<dh>,<dl>,6,'TR', 5,4,8,11" sets ring to channels 5, 4, 8 and 11 Tip: The ring follows the stored order, channels do not have to be in ascending order Ex2: "\$A5,<dh>,<dl>,8,'TR', \$82,5,\$87,11" sets channels 2-5 and 7-11. You can specify a range using MSB bit for the first channel; the next byte is the last.
Control Lock	LM	"\$A5,<dh>,<dl>,3,'LM',<control>" (7 bytes) Locks out front panel and IR remote control functions. Bit 7 Selects IR remote control operation, except vol. (0=enabled, 1=disabled)

iC-Net Zones

To simplify controlling groups of devices, iC-Net is divided into 16 zones of 255 devices. All the devices within each zone can be controlled simultaneously by sending a command to a single "virtual device number".

For example, noting the zone chart below, if we send a Power On command to device #256, any TV controller numbered between 257 and 511 will instantly turn on. If we send a Power Off command to device #4095, all devices in the system will turn off.

This is an immensely powerful feature, because most systems can only address one device at time. So if you need to turn off all 50 TV in a zone, you would need to send 50 commands. In addition to the hassles of creating multiple commands, there would be a long delay between the first and last command. One command, instant response is easier.

As we noted before, ABC Media Retrieval Systems reserve Zone 0 for devices used in the central control system, 1 -15 for iC-Net devices. This structure may be useful for your application, or you could use Zone 0 just like any other iC-Net zone.

Zone	First Device	Last Device	Virtual Device
0	1	255	0
1	257	511	256
2	512	767	512
3	769	1023	768
4	1025	1279	1024
5	1281	1535	1280
6	1537	1791	1536
7	1793	2047	1792
8	2049	2303	2048
9	2305	2559	2304
10	2561	2815	2560
11	2817	3071	2816
12	3073	3327	3072
13	3329	3583	3328
14	3585	3839	3584
15	3841	4000	3840
All Zones			4095

Tip: You've probably figured out that you never want to assign a **virtual device** number to an **actual device** in the system. If you assigned #1536 to a device, all the TV controllers in Zone 6 would respond every time you sent a command to that one device.

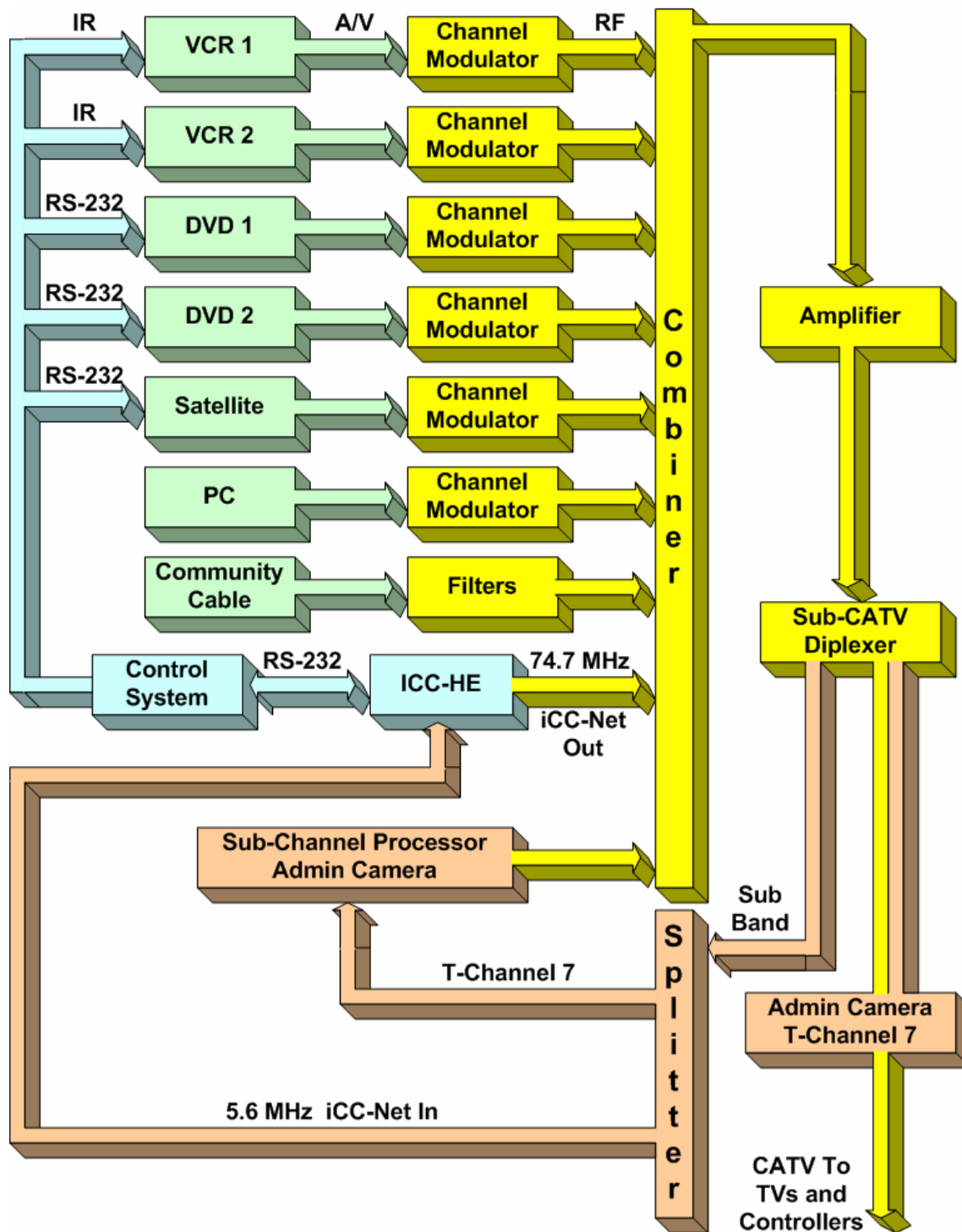
System Map

One of the key tasks for iC-Net integrators is to create a logical **System Map**, assigning device numbers to TV controllers so they fall into logical zones. The device mapping could be sorted by type or location; whichever suits the application.

iC-Net Zone	Zone	Room	Device	S1	S2
1	W 1 st Floor		256		
		W151	257	1	1
		W152	258	2	1
		W153	259	1+2	1
		W154	260	3	1
2	W 2 nd Floor		512		
		W251	513	1	2
		W252	514	2	2
		W253	515	1+2	2
		W254	516	3	2
3	E 1 st Floor		768		
		E151	769	1	1+2
		E152	770	2	1+2
		E153	771	1+2	1+2
		E154	772	3	1+2
4	E 2 nd Floor		1024		
		E251	1025	1	3
		E252	1024	2	3
		E253	1025	1+2	3
		E254	1026	3	3
5	Coffee Areas		1280		
		G100	1281	1	1+3
		G150	1282	2	1+3
		G151	1283	3	1+3
6	Day Care		1536		
		TV 1	1537	1	2+3
		TV 2	1538	2	2+3
7	Hallways		1792		
		W1	1793	1	3+3
		W2	1794	2	3+3
		E1	1795	1+2	3+3
		E2	1796	3	3+3
8	Office		2048		
		Admin	2049	1	4
		A/V Center	2050	2	4
All Zones	All		4095		

Typical RF and ICC-Net Signal Flow

The diagram below shows the structure of a typical Contemporary Research media retrieval system. One of the key aspects for iCC-Net communication is to provide a forward and return (sub-channel) path for data if you're using ICC2 2-way TV Controllers.



Safety Instructions

Read before operating equipment.

1. **Cleaning** - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
2. **Power Sources** - Use supplied or equivalent UL/CSA approved low voltage DC plug-in transformer.
3. **Outdoor Antenna Grounding** - If you connect an outside antenna or cable system to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.
4. **Lightning** - Avoid installation or reconfiguration of wiring during lightning activity.
5. **Power Lines** - Do not locate an outside antenna system near overhead power lines or other electric light or power circuits or where it can fall into such power lines or circuits. When installing an outside antenna system, refrain from touching such power lines or circuits, as contact with them might be fatal.
6. **Overloading** - Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
7. **Object and Liquid Entry** - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short out parts, resulting in a fire or electric shock. Never spill liquid of any kind on the product.
8. **Servicing** - Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
9. **Damage Requiring Service** - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - When the power supply cord or plug is damaged.
 - If liquid spills or objects fall into the product.
 - If the product is exposed to rain or water.
 - If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. An improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
 - If the video product is dropped or the cabinet is damaged.
 - When the video product exhibits a distinct change in performance, this indicates a need for service.

*** Note to CATV system installer:** This reminder is provided to call CATV system installer's attention to Article 820-40 of the National Electrical Code (Section 54 of Canadian Electrical Code, Part I), that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building as close to the point of cable entry as possible.

Limited Warranty and Disclaimer

Contemporary Research Corporation (CR) warrants this product to be free from defects in material and workmanship under normal use for a period of two years from the date of purchase from CR. Should such a defect occur CR will repair or replace, at their option, the defective product at no cost for parts or labor.

This warranty extends to product purchased directly from CR or an Authorized CR Dealer. Consumers should inquire from selling dealer as to the nature and extent of the dealer's warranty, if any.

All warranty claims must be shipped pre-paid to the factory. Call or fax to obtain a Return Material Authorization (RMA) number.

CR is not liable for any damages caused by any of its products or for the failure of any products to perform, including any lost profits, lost savings, incidental damages, or consequential damages. CR is not responsible for any claim made by a third party or made for you by a third party. This limitation of liability applies whether damages are sought, or a claim is made, under this warranty or as a tort claim (including negligence and strict product liability), a contract claim, or any other claim. This limitation of liability cannot be waived or amended by any person. This limitation of liability will be effective even if CR or an authorized representative of CR has been advised of the possibility of any such damages.

Some states do not allow a limitation of how long an implied warranty lasts. Some states do not allow the limitation or exclusion of incidental or consequential damages for consumer products. In such states, the limitation or exclusion of the Limited Warranty may not apply to you. This Limited Warranty gives you specific legal rights. You may also have other rights that may vary from state to state. You are advised to consult applicable state laws for a full determination of your rights.

Except as expressly set forth in this Limited Warranty, CR makes no other warranties, expressed or implied, including any implied warranties of merchantability or fitness for a particular purpose. CR expressly disclaims all warranties not stated in this Limited Warranty. Any implied warranties that may be imposed by law are limited to the terms of this Limited Warranty.